

Art Unit: 2812

is motivated to modify Liou with Gardner to obtain a reduction in channel length (see Gardner, abstract).

[Re claims 2 and 15] The combined teaching of Liou and Gardner discloses a method of forming an etch stop layer in a semiconductor structure comprising: providing a semiconductor substrate; providing a poly-metal structure with at least one polysilicon layer on said semiconductor substrate; wherein said at least one polysilicon layer has an upper surface and a lower surface; and implanting ions selected from oxygen, nitrogen, carbon, fluorine, and combinations thereof into said at least one polysilicon layer to form substantially horizontal etch stop layer within said at least one polysilicon layer and spaced from said upper surface and said lower surface, as shown above. Gardner also discloses wherein said substantially horizontal etch stop layer comprising SiO<sub>x</sub>, SiN<sub>x</sub>, and combinations thereof; the examiner interpreted that because the implanted ions of the reference are the same as of the claimed invention, same characteristics must be obtained. Liou also discloses providing an oxide layer 14 between said semiconductor substrate and said at-least one polysilicon layer.

[Re claim 4] Gardner also discloses wherein said ions comprise nitrogen ions; [Re claim 8] wherein said etch stop layer comprises a SiN<sub>x</sub> layer [Re claim 11] wherein said ions are implanted such that said etch stop layer comprises a continuous etch stop layer (see Fig. 3a).

Therefore, it would have been obvious to combine Liou with Gardner to obtain the invention as specified in claims 1-2, 4, 8, and 11.

5. Claims 3, 5, 7, 9, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Gardner, as applied above, and further in view of Abernathey et al. (USPN 4601779, hereinafter "Abernathey")

The combined teaching of Liou and Gardner discloses substantially the limitations of claims 3, 5, 7, 9, and 12-13, as shown above.

But it does not disclose that the implanted ions are oxygen, carbon, fluorine, or combinations thereof, their location in the polysilicon layer and the etch stop comprising SiO<sub>x</sub> and combination of SiO<sub>x</sub> and SiN<sub>x</sub>. However, the missing limitations are well known in the art because Abernathey discloses substantially [Re claim 3] wherein said ions comprise oxygen ions; [Re claim 7] wherein said etch stop layer comprises a SiO<sub>x</sub> layer; [Re claim 5] wherein

Art Unit: 2812

said ions comprise carbon ions; [Re claim 12] wherein said ions are implanted such that said etch stop layer resides within said polysilicon layer adjacent an upper surface of said polysilicon layer; [Re claim 13] wherein said ions are implanted such that said etch stop layer resides within said polysilicon layer adjacent a lower surface of said polysilicon layer (See Fig. 1 and par. bridging cols. 3-4 ). A person of ordinary skill is motivated to modify Ibok with Abernathey to obtain etch stop layer where it is needed for an application.

[Re claim 9]The combined teaching of Liou, Gardner and Abernathey fails to disclose wherein said etch stop layer comprises SiO<sub>x</sub> and SiN<sub>x</sub>. However, this would have been obvious to an ordinary artisan to do so when the etching characteristics required need for the combination of nitrogen and oxygen ions to be implanted.

6. Claims 6, 10, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liou in view of Gardner, as applied above, and further in view of Ibok et al. (USPN 5940718, hereinafter "Ibok").

The combined teaching of Liou and Gardner discloses substantially the limitations of claims 6, 10, and 14, as shown above.

But it does not disclose [Re claim 6] wherein said ions comprise fluorine ions; [Re claim 10] wherein said ions are implanted such that said etch stop layer comprises a patterned etch stop layer; [Re claim 14] wherein said ions are implanted such that said etch stop layer is conductive.

However, Ibok discloses that any element that has etch characteristics appreciably different from those of the silicon can be used as implanted ions (see col. 3, lines 62-65).

It would have been obvious to use fluorine ions because fluorine ions meet this requirement to be implanted ions, and fluorine gas is readily available for other steps in the semiconductor making process. When fluorine ions are used the etch stop is conductive.

#### ***Response to Applicant's Amendment***

7. In view of Applicant's arguments the objection to the specification has been withdrawn.

In view of Applicant's filing of a Terminal Disclaimer the Double Patenting rejection of claims 1, 2, and 15 has been withdrawn.

Art Unit: 2812

In view of Applicant's arguments and the amendment to the claim, the rejection of claim 15 under 35 U.S.C. 112 second paragraph, as being indefinite and the rejections of claims 1-15 under 35 U.S.C. 102 or 103, as stated in the immediately preceding Office Action, have been withdrawn.

Applicant's arguments with regard to the rejections under 35 U.S.C. 102 or 103 have been rendered moot in view of the new ground of rejection.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha T. Nguyen whose telephone number is (571) 272-1678. The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week. The telephone number for Wednesday is (703) 560-0528.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt, can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

Art Unit: 2812

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ha Nguyen

Primary Examiner

10- 28 - 05

<b>Notice of References Cited</b>	Application/Control No. 10/894,292	Applicant(s)/Patent Under Reexamination AGARWAL, VISHNU K.	
	Examiner Ha T. Nguyen	Art Unit 2812	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-5,854,115 A	12-1998	Gardner et al.	438/305
	B	US-4,978,637	12-1990	Liou et al.	438/586
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.